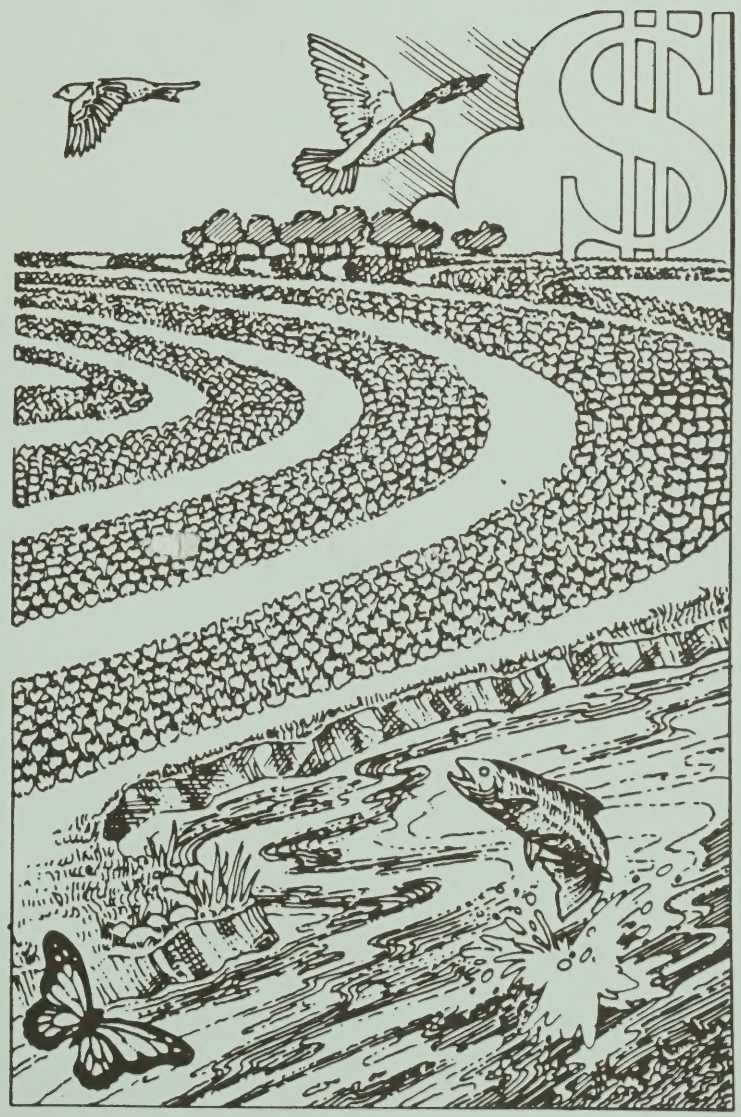
WASHINGTON

# Western Region Projects Supported by Sustainable Agriculture Research and Education Program



Cooperative State Research Service, USDA
in cooperation with Extension Service, USDA
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Edited by

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from project reports

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# Overview of Washington Projects

Congress has provided strong and growing support for the Sustainable Agriculture Research and Education grants program, also known as LISA (Low-Input Sustainable Agriculture). Administered by Cooperative State Research Service (CSRS), with the Cooperative Extension Service as a full partner, this program is forging partnerships between farmers, scientists, educators, agribusiness, non-profit organizations, and government -- a partnership that is beginning to promote better stewardship of the Nation's natural resource base. The program has supported 112 new projects since its inception in 1988; perhaps two dozen more will be funded by June.

Projects funded are typically carried out by teams of farmers, university research and education staff, government agencies, non-profit organizations, and private enterprise. Top priority is given to whole-farm integrated systems projects, usually including on-farm research and demonstrations. These projects are providing scientific documentation of low-input sustainable farming practices and systems, in comparison with conventional or chemical-intensive agriculture.

Farmer involvement is one of the strengths of this program -- 1,860 farmers nationwide have participated in projects during the first three years. When farmers participate in the planning and execution of a project, two important things happen. Concerns of farmers are foremost in the design of the project. And scientists get directly exposed to innovative ideas developed or tried by farmers. These ideas often become an integral part of scientific studies. The result is both better science and a more widespread adoption of more sustainable farming methods that are economically viable, socially acceptable, and environmentally sound, assuring cleaner water and a plentiful supply of safe food for generations to come.

The coordinators of Washington projects were asked about participating farmers. Here is what they reported:

- A total of 55 Washington farmers have participated in LISA research and education projects;
- 52 are reported to have helped generate ideas for these projects, and 13 help manage the projects;
- 22 farmers have provided land for replicated experiments; another 29 provided land for unreplicated studies, and 21 for demonstration plots;
- 23 are helping with the evaluation of projects.

## Projects Funded 1988-1990

Five projects funded by this program that include Washington scientists, farmers, or educators in major roles are described here. They received a total of $742,541, and provided $288,084 matching funds. In most of the projects, a scientist serves as the Project Coordinator. In others, a farmer or other local area residents are contributing to a multi-state project headquartered in another state.

# Evaluation and Design of Low-Input Sustainable Vegetable/Small Grain and Small Fruit systems of Western Oregon and Washington (LW88-1)

## Summary

*Phase I* successfully built public and faculty awareness of the complex and interrelated issues associated with sustainable agriculture, and has resulted in a more effective method of organizing research and extension at the field level. Key biological, social, and economic processes have been examined by multidisciplinary teams to understand how management manipulations are affecting a variety of farming systems.

*Phase II*, now under way, builds on the knowledge obtained in Phase I by conducting educational and research programs that work toward development of a more sustainable agriculture system. Educational programs for Phase II include: 1) continued publication of the PNW Sustainable Agriculture newsletter, 2) farmer/scientist focus sessions, 3) farmer-to-farmer tours, 4) in-service faculty workshops, and 5) interactive public forums.

During Phase I many potential research hypotheses were developed by both growers and research scientists. Due to limited resources, only a few of these can be addressed in Phase II. Priorities have been jointly identified by farmers, marketers, biological and social scientists. The project will investigate the following interrelated components: 1) vegetation management (cover cropping research), 2) biological control of insect pests in peas and brassicas, 3) socioeconomic implications of the vegetation management and biological control technologies on farm families and farm personnel, and 4) to continue monitoring the Whole Farm Case study operations. This research will serve to understand and assess the biological interactions and socioeconomic implications of developing more biologically diverse agriculture systems.

Both experiment station and on-farm research is being conducted. More detailed and extensive treatments are done at the Experiment Stations. A subset of promising technologies or treatments are tested on farms to determine agronomic feasibility, economic analysis, and social implications of cover crop and biological control systems within the whole farm system. Research findings will be disseminated at grower and public interest meetings, in the PNW Sustainable Agriculture newsletter, and in Extension publications and journal articles.

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| **Project Coordinator:** | Richard P. Dick, Co-Principal Investigator, **Oregon State University**; Jack L. Waud, Co-Principal Investigator, **Washington State University** |
| **Major Participants:** | **WSU**: W. C. Anderson; **WSU-Puyallup**: A. L. Antonelli, L. M. Butler, R. S. Byther, R. W. Carkner, S. Kuo; **WSU-Mt. Vernon**: S. W. Howard; **Oregon State University**: G. Crabtree, R. S. Karow, L. S. Lev, P. B. McEvoy, D. McGrath, A. M. Morrow, H. Murray, R. D. William |
| **Cooperators:** | H. Berry, D. Biever, L. Brophy, C. Brun, W. Deryckx, G. Fisher, J. Grant, W. Haglung, D. Havens, K. Jonson, G. Kahn, P. Labine, D. Lively, C. Moulton, C. Mundt, O. Tilth, L. Parker, R. Penhallegon, B. Strik |
| **Project Duration:** | 2 Year funding |
| **Total Funding:** | LISA Funds: $334,105; Matching Funds: $251,904 Washington State University received $137,716. |

# Options to Enhance the Sustainability of Dryland Cereal Cropping in the Northwest (LW88-2)

## Summary

The overall goal of this project is to develop a comprehensive research and education program to help dryland producers in the Northwest implement sustainable grain and legume cropping systems which will reduce environmental impacts and external, non-renewable production inputs while maintaining or improving profitability.

Dryland cropping regions in the northwestern U.S. share the common problems of economic instability and resource deterioration. Major constraints to change include chronic moisture deficits, soil degradation, export dependence, and government farm programs. The limited moisture conditions often result in poor yields and minimize the number of production options that growers can choose from. In the driest areas, summer fallow is a standard practice used to economically produce a crop. However, this practice also plays a role in soil deterioration, erosion, and saline seep. The wetter areas have more agronomic options, but choices are often limited by the restrictive regulations of government farm programs. Finding farming practices that can maintain or enhance both profitability and natural resources is particularly difficult in dryland regions.

In addition to the biophysical constraints on dryland agriculture, growers face the loss of important production inputs, such as certain fertilizers and pesticides. The recent proposal to classify anhydrous ammonia as a hazardous substance, although rejected, threatened to greatly restrict transport of this material, which is the cheapest and most widely used nitrogen source in the region. Registration of the herbicide Dinoseb was canceled in 1987, thus limiting the weed control options in peas and lentils grown in rotation. Cases of weed resistance to herbicides have been documented. The fungus that causes strawbreaker footrot (an important cereal disease) is becoming resistant to certain fungicides. The lack of incentive for the pesticide industry to develop new pesticides or to maintain or develop materials for use in minor crops accentuates the need for alternative pest control methods so growers can diversify their crop rotations.

For these reasons, researchers, Extension workers, and growers involved with dryland farming in Washington, Idaho, Oregon, Montana, Wyoming, and Utah initiated a USDA-LISA funded project in the fall of 1988. The project has focused on identification of historical and current information on cropping alternatives in cereal-based systems, dissemination of the information to user groups, and prioritization of future research needs and extension activities. The second phase of the project emphasizes continued regional communication, development of on-farm testing and documentation, and in-depth research into soil quality, soil biology, and the benefits of rotational systems.

A comprehensive review of the historical and current literature on dryland cropping systems alternatives was completed during the first phase of the project. This information has been used by Washington State University (WSU) cooperators to develop a computer citation database that is now available to the public. The highlights of the review are being compiled in a six-state resource guide on dryland farming. A regional newsletter called the *Sustainable Farming_Quarterly* is published by the project and features articles on historical studies, current research, and innovative farmers.

A project publication from Oregon State University (OSU) summarizes the findings of 50 continuous years of research on plots near Pendleton, Oregon. These plots are the oldest continual dryland research plots in the Northwest, and they offer a unique chance to measure long-term changes due to crop and soil management in the region. Numerous other publications and presentations have been developed by project cooperators as part of the educational effort.

Project cooperators have been involved in several surveys. In Wyoming, a survey of dryland farmers found that 60 percent of farmers currently used no fertilizer, and 20 percent used no herbicide, indicating that many farmers in this marginal area are indeed low-input. A group of eastern Washington and northern Idaho farmers using alternative practices and rotations were surveyed through detailed interviews in an attempt to learn what alternatives were actually in use on a commercial scale. This information is summarized in a WSU publication and is being used in an associated project of economic and policy modelling.

Several major conferences have been organized by project cooperators, including a Soil Building Cropping Systems conference in Montana and four dryland Farming for Profit and Stewardship conferences in northern Idaho and eastern Washington.

Project cooperators are involved in many on-going research efforts. Oregon scientists are examining the effects of long-term management on soil microbiology factors, including microbial diversity and soil-borne plant pathogens. Management effects on soil quality factors are being studied by Washington researchers. In Idaho, a combine-mounted yield mapping system is being developed for use in field management of variable landscapes. Montana and Wyoming cooperators are focusing on replacement of summer fallow with low-water use legumes to conserve soil and reduce nitrogen fertilizer needs. Alternative rotations are being tested by Utah researchers, and expanded use of the Miranda protein pea is one significant outcome.

Project activities include on-farm testing as well. While farmer-initiated research, demonstration, and information exchange have been highly successful in the Midwest, similar strategies have not been widely used in the dryland regions of Washington, Oregon, and Idaho. The great environmental diversity among locations in the dryland region makes it difficult to transfer information from a single experiment station to a given farm.

On-farm testing is important for several reasons. Much of the historical information compiled to date was generated prior to semi-dwarf wheat varieties and widespread use of N fertilizer. Growers need to test this information in the context of today's practices and soil conditions. It is not possible to initiate rotational studies and generate valid results with the short-term project funding. But data can be collected from existing rotational systems on farms to determine some of the long-term effects. Many alternative practices are being used by farmers, and documentation of their performance is needed in order to extend the information to others. Growers are concerned about impending increases in regulation and loss of production tools, and view on-farm testing as a way for them to quicken the introduction of alternative practices.

On-farm tests supported by the project include tillage, variety, fertility, and green manure comparisons. Also, soils from a series of paired farms with contrasting management histories are being analyzed to document any measurable differences in soil condition due to farming practices. Farm tours have been held to view alternative practices, and more are planned for the future.

To date, the project has had a significant educational impact in the dryland region. The most promising areas for enhancing sustainability include soil quality improvement, use of rotation effects, variable landscape management, and fallow replacement. At present, few options exist for weed control, and moisture management strategies are limited in many areas. Economic data for evaluating alternatives are sorely lacking as well. By continuing the research activities, maintaining a high level of farmer involvement, and emphasizing regional communication, the project cooperators are optimistic about making dryland farming more sustainable in the Northwest.

**Project Coordinators:** David Granastein, Project Manager, **Washington State University**; D. F. Bezdicek, Principal Investigator, **Washington State University**; and B. C. Miller, Co-Principal Investigator, **Washington State University**

**Major Participants:** **Montana State University**: J. R. Sims; **Utah State University**: V. P. Rasmussen; **Oregon State University**: R. W. Smiley; **University of Idaho**: C. L. Peterson

**Project Duration:** 2 Years

**Total Funding:** LISA Funds: $470,000; Matching Funds: $186,023; Washington State University received $23,345

# Total Resource Budgeting of LISA Farm Enterprises (LW89-15)

## Summary

Enterprise budgets serve as a useful planning tool to help producers make resource allocation decisions. Traditional enterprise budgets do not account for all resources and they are not always appropriate to use when decisions include adopting new technology. This project develops a consistent format and methodology for developing enterprise budgets that allows valid comparisons between alternative enterprises, especially those enterprises using non-traditional practices. A variety of crops, cropping systems and livestock enterprises are included.

**Project Coordinator:** Paul Patterson, **University of Idaho**

**Major Participants:** **Washington State University**: R. W. Carkner; **University of California**; K. Klonsky; **Montana State University**: A. E. Baquet, D. Griffith, J. B. Johnson; **Colorado State University**: B. B. Bainbridge; **New Mexico State University**: J. D. Libbin; **Oregon State University**: T. L. Cross; **University of Alaska**: K. Baker; **University of Arizona**: J. C. Wade; **Utah State University**: L. K. Bond; **University of Missouri**: J. Ikerd

**Project Duration:** 1 Year

**Total Funding:** LISA Funds:$31,000 Matching Funds: $59,513
Washington State University received $95,000.

# Alternatives for Fruit-Growers (LW89-17)

## Summary

Grazing sheep in the understory of fruit tree orchards is a promising means of diversifying agricultural production and enhancing the efficiency and profitability of some orchard operations while reducing the use of chemical inputs. This study, conducted jointly with a farmer in a commercial orchard, quantifies both the benefits and the problems resulting from such a system. Three treatments are imposed on an existing orchard: grazed and ungrazed existing understory and grazed understory of forage species. Forage and fruit production, tree phenology, soil compaction and soil nitrogen changes, damage to trees from rodents and from sheep, management requirements, and comparative economic advantages are assessed and compared between treatments during a 2 year period. Tours and demonstrations, as well as publications are used to disseminate results.

**Project Coordinator:** Linda H. Hardesty, **Washington State University**

**Major Participants:** **Topcliffe Farm**: W. E. Howell; **Utah State University**: F. Proveza

**Project Duration:** Funded 2 years; total anticipated - 3 years.

**Total Funding:** LISA Funds: $42,641; Matching Funds: $37,429

# Information Delivery System for use in Implementation of LISA Research and Technology (LW89-21)

## Summary

Many organizations have funded and/or developed research on low-input sustainable agriculture (e.g. USDA, Northwest Area Foundation, UC-SAREP, etc.). To utilize the large database of information that is being developed, it must be delivered to farmers (also marketers and consumers) in usable forms. To avoid duplication of effort and to assure that all research projects are being assessed, a multi-state, multi-organization and multi-discipline coordinating and dissemination effort is required.

Low-input sustainable agriculture research information in forms suitable for use by farmers and others will be compiled into a computer resource library that can be translated into hard copy upon demand. Some publications will also be developed. The library will also contain video tapes on specific topics, as presented at conferences, workshops and seminars. Subject matter emphasis of this project will be farm diversification (cropping and livestock systems), specialty crops, marketing, sustainable organic practices, and education methodologies. Regional and statewide conferences, workshops and seminars will be organized.

The effectiveness of the various education methodologies will be measured, including the sources and types of information that facilitated the greatest adoption of sustainable production and marketing. The market potential for commodities produced using various types of farming practices will be determined.

**Project Coordinator:** Ronald E. Voss, **University of California**

**Major Participants:** **University of California**: D. Visher, R. Cook, J. Auburn, J. Coates, J. I. Grieshop, A. Raj, G. McGourty; **University of Idaho**: D. Barney; **University of Arizona**: R. Gibson; **Oregon State University**: D. McGrath, L. Lev; **Washington State University**: C. Moulton; **Committee for Sustainable Agriculture**: O. Wollan

**Project Duration:** Funded 2 Years; total anticipated, 3 Years

**Total Funding:** LISA Funds: $112,000; Matching Funds: $162,500
Washington State University received $9,500.